Grant Proposal Narrative

We appreciate your interest in submitting a proposal to the Bill & Melinda Gates Foundation and we thank you for working with us throughout the proposal process. Your designated foundation contact will continue to work collaboratively with you as you prepare your proposal to help you understand the connection between the foundation's relevant program strategy and the proposed project, as well as to respond to any questions you might have over the course of this process. You are encouraged to communicate with your program officer to make sure that your efforts are aligned with the proposal requirements and that you are not expending unnecessary time or energy in this process.

Answer all of the questions in this Proposal Narrative template and submit it to your foundation program officer for review and collaborative discussion. Due to tax, legal, and reporting requirements, all proposals must be submitted in English. The proposal must be submitted in Word, as PDFs will not be accepted. 4

This is a proposal shaping document and not a commitment by the foundation to fund the work.

General Information

Proposal Title	TB Modelling and Analysis Consortium (TB MAC)		
Investment Duration (Months)	36	**Opportunity ID**	OPP1135288
Requested Amount (U.S.$)	$3,358,801		
Total Project Cost (U.S.$)	$3,719,156		

Prospective Grantee Information

Organization Legal Name[1]	London School of Hygiene and Tropical Medicine		
Organization Doing Business As			
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[1] **Legal Name:** will be used in the agreement and should match the name on the bank account that receives the grant funds (assuming fully executed agreement)
[2] **Feedback Contact/Email:** The full name and email of the contact whom foundation staff queries for various surveys.

Tax Status (if known & applicable) *Refer to Tax Status Definitions*	Section 4940(d)(2) Exempt Operation Foundation	**Organization's Total Revenue for Most Recent Audited Financial Year (U.S.$)**	$146 million
U.S Employer Identification Number (EIN) (If applicable)	[##-#########]		

Submission Information

Date Submitted	2016_09_15	**Submitted by same as above**	**Yes**
Submitted by Contact Name	Richard White	**Submitted by Contact Email**	richard.white@lshtm.ac.uk

Submitted by Contact Title	Dr	Submitted by Contact Phone	+44 207 299 4626

Proposal Details

The Foundation is prohibited from conducting or funding any lobbying or political campaign activities, as these terms are specifically defined under U.S. tax law. Unlike many of our grantees/vendors who may engage in limited lobbying, the Foundation cannot lobby or fund any lobbying activities carried out by its grantees/vendors. We request that you please review the information at the following link, Foundation Funds and Advocacy, to assess whether any of your proposed activities may constitute lobbying as defined by the IRS. If so, you should revise your proposal accordingly prior to submission.

1. Executive Summary

Provide a brief summary of the investment.

The TB Modelling and Analysis Consortium (TB MAC) will increase the effectiveness and efficiency of TB control policy and practice at global and country level. We will achieve this by ensuring:

1. Improved co-ordination, knowledge sharing and management within TB community
2. New high quality modelling guidelines and resources
3. Better informed TA/decision making communities and modellers

This is not a typical research project proposal; at its core are a series of critical sustainability and community capacity strengthening activities that will enable this investment to succeed. By the end of the investment period, countries, global health policy makers and funders will be making better, more data-informed decisions that improve the effectiveness and efficiency of TB control.

Describe the charitable purpose of this work. (1-2 sentences)

Note: This will inform the description of the investment, if approved, in any agreement and if posted on gatesfoundation.org.

To reduce the global burden of TB by increasing the effectiveness and efficiency of TB control policy and practice at global and country level.

2. Problem Statement

Describe the problem, why it is a problem, and who is impacted by the problem. What specific elements of the problem is this investment trying to address?

Our problem analysis started from a user perspective in a needs assessment of key stakeholders. These included policy makers, funders, new technology partners, technical assistance agencies and country National TB Programs. **A clear need was expressed to advance the capacity to develop, understand, and use the results from quantitative frameworks (i.e., epidemiological and economic models) to improve decision-making by making decisions more transparent and data-driven**. WHO's Global TB Programme (WHO GTB) stated they needed the results from models for building policies, advocacy and estimation of disease burden. GFATM stated models were needed to inform internal GFATM TB needs assessments, strategy goals, and between-county resource allocations, and also to improve concept note submissions. The StopTB Partnership said models were needed by their partners for resource allocation as well as advocacy, market shaping, and reducing TB burden at country level by improving TB control. USAID stated models were needed to prioritise interventions at the country level. World Bank stated models were needed for country level resource allocation. BMGF stated models were needed to invest more efficiently, for advocacy, and to identify data gaps and reasons for lack of intervention impact. TB Alliance stated models were needed to identify the best diagnostic algorithms for the roll out of new regimens, and FIND stated models were needed to help countries make choices and trade-offs as new tests become available. The technical assistance agency KNCV advocated for models that forecast resource needs and health impact, allowing country-level assessment of comparative cost-effectiveness, and for prioritisation and Investment Cases. Finally, the National TB Program (NTP) in Viet Nam stated epidemiological and economic models were needed to inform policy choices and mobilise resources, and the NTP in South Africa stated models were needed to help them determine which interventions to use, and the resources required, to reach their adopted TB targets. In summary, a wide diversity of stakeholders at the country, global, and technical assistance levels all identified a need for models to improve decision-making for better TB control.

In its first three-year grant period, TB MAC made great strides in improving TB modelling efforts globally. We helped to foster a community of modellers across multiple academic and country-level institutions; held meetings to discuss major issues in modelling HIV-associated TB, diagnostic testing, and novel drug regimens and identify and fund critical research; and led a first-of-its-kind comparative modelling exercise across multiple modelling teams to evaluate our ability to meet global TB control targets from both an epidemiological and economic perspective (the TB MAC 'Targets' project). We have input into many high level meetings, for example the External Review of the Global Fund Distribution of Funding by Disease Meeting, that resulted in the GFATM decision not to reduce the proportion of the GFATM funds allocated to TB. We have funded the development of models and methods, for example those now used by WHO GTB to make estimates for HIV-positive TB incidence and mortality and indirect estimates of HIV-negative TB mortality for countries without VR or mortality survey data (box 2.1 in WHO report here). TB MAC has also influenced activities at country level. The results from the TB MAC Targets project were used as the basis for the first ever TB Investment Case in South Africa, which has led to the South African government change of policy to improve screening in clinics, and is currently being used to update domestic funding TB control priorities, and increase funding for TB, in South Africa. Tools developed under TB MAC funding have also been used to improve the recent GFATM Concept Note submission in Viet Nam (resulting in an additional $20m in incentive funding), and reprogram the Ghana GFATM grant (after the recent survey showed much higher TB prevalence).

However, despite these advances, there remain critical networking, resource and policy-maker capacity gaps that need to be addressed to meet these stakeholders' needs and optimise the effectiveness of TB modelling efforts – gaps that TB MAC is now poised to fill, given our track record of leadership established over the last four years.

Firstly, although TB MAC has improved **networking** between policy makers and modellers/economists over the past three years (see TB MAC independent evaluation), this has primarily been limited to a few key individuals and institutions. More formal and consistent links between policymakers, modellers and economists need to be developed if we are to improve communication and better manage and meet policymaker needs.

Secondly, there are also critical gaps in the **resources** available to policy makers and other stakeholders to inform decision making. There is a small number of modellers and economists who have the knowledge, ability and time to be able to work with TB policy makers. There are a small number of TB impact modelling groups globally and an even smaller number of economists who have the expertise to perform economic analyses of TB control at both global and country level. There is a particular gap in the community's ability to assess the efficiency or 'value for money' of investments in the development and selection of new technologies or their scale-up at the country level. TB MAC has helped to develop an early but vibrant TB modelling community and is therefore now poised to help fill this gap. If we are to succeed in leveraging this community to develop the necessary tools, strong continuing support is needed.

Even if this technical capacity and expertise is developed, another key challenge that was identified in our needs assessment was a lack of evidence on how investments in different TB control strategies and interventions can impact the TB epidemic. In part this gap is the result of the recent interventions (and the expected scarcity of data associated with new approaches), including scale up of active case finding and social protection, but there is also a dearth of data for how much even well-established interventions cost in different epidemiological settings. For example, there are very few studies on MDR-TB diagnosis and treatment, first line treatment data are outdated and may not reflect current practices; and there are almost no data on more complex interventions such as active case finding and social protection.

Focussing on the analytic tools to inform decision makers, there is a great need to leverage existing data into quantifiable and refutable frameworks that can identify the policies and strategies most likely to have the greatest impact on human health given available resources. Modelling frameworks to inform TB programme strategies and the estimation of resource requirements across *a range* of possible TB control interventions are even more limited, with few published impact models and no published peer reviewed economic models available. There are critical technical issues still to be addressed, including how best to incorporate health systems and programmatic characteristics into modelling, how the synergies and scale of different TB control interventions should be considered, and how to optimise across different targets and outcomes. Thus new modelling tools are required.

WHO/GTB and GFATM faces particular challenges that illustrate some of the issues that TB MAC aims to address. The WHO Task Force on TB Impact Measurement (WHO TF) scope has expanded to include a modelling stream on TB disease burden, intervention impact and allocative efficiency. The needs of this WHO TF include co-ordination of the modelling work under this stream, a review of the suitability of current data and models for country level allocative efficiency and recommendations for the future, and the creation of modelling guidelines for country projections linked to country epi-reviews. GFATM needs guidelines for reviewers of modelling evidence submitted in Concept Notes. In addition, the recent GFATM board meeting required the use of transmission models to inform and connect three areas of internal GFATM work: the overall needs assessment, strategic goals setting if needs are not fully met, and allocative efficiency. GFATM/WHO may also have a need for the coordination of modelling for (proposed but not yet funded) regional 'high priority country' WHO/GFATM data/modelling workshops.

Current TB data and models are not yet adequate to meet these needs, and careful co-ordination of the supply of the limited modelling resource in the face of this high demand is desirable.

Finally, in order to ensure that the results of these analyses can be translated into policy, there must be opportunity for meaningful interaction between decision makers and modellers, and these decision-makers must have access to key information about the strengths, limitations, and uncertainties inherent in modelling. There is currently a lack of capacity at global, and particularly country, level, to source, interpret and integrate modelling and economic results into decision making. Therefore, **policy makers require additional support and education to integrate these new tools into their decision making process.**

As is evident from the needs assessment and these gaps, advancing the capacity to develop, understand, and use quantitative and data-driven frameworks (i.e., epidemiological and economic models) at all levels would dramatically improve the current approach to TB control, ultimately leading to healthier populations and more judicious use of resources while also making the greatest use of the data that we currently have available.

This investment would allow us to address these critical networking, resource and decision-maker capacity gaps and increase the effectiveness and efficiency of TB control policy and practice at the global and county level. **To achieve this TB MAC has developed a Theory of Action (see figure) and a detailed plan**. By implementing this plan, we seek to create a world in which there are:

- Improved co-ordination, knowledge sharing and management within TB community
- New high quality modelling guidelines and resources
- Better informed TA/decision making communities and modellers

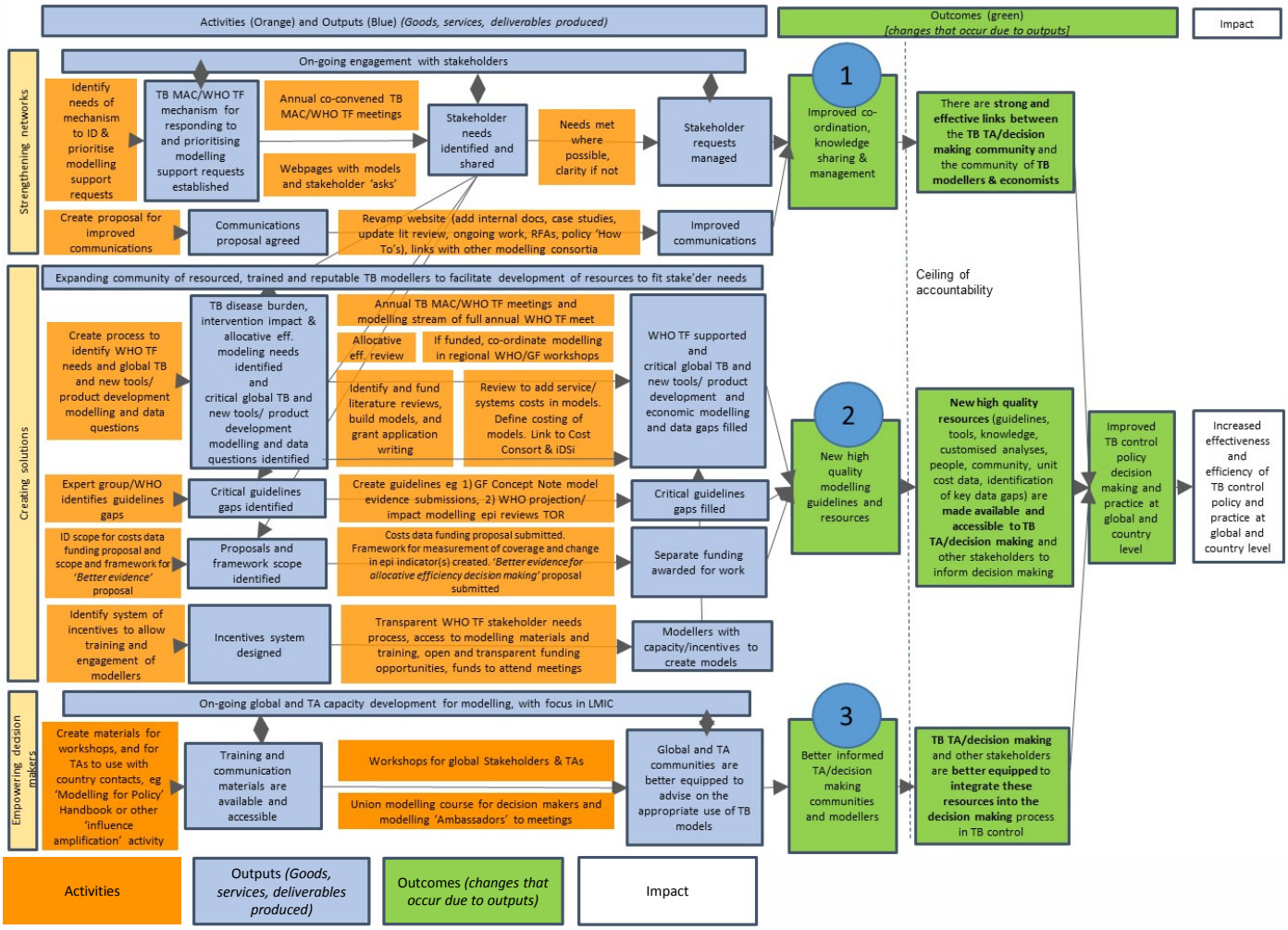
3. Scope and Approach

Describe the scope and approach of the proposed work. This should be a narrative description of the principal results the investment would achieve and how those results relate to the problem described above (rather than a list of outcomes and outputs.) Note: You will provide a list of outcomes and outputs in the Results Framework

The Foundation's investment in TB MAC will enable TB policymakers at all levels to have ready access to teams with the quantitative expertise to leverage data into frameworks for decision-making, a suite of validated tools that make the best use of available data to inform specific decisions, and a vibrant community of modellers who understand the TB policy space as well as the limitations of available data. Decision makers and modellers will work together to fill our biggest knowledge gaps while making decisions based on the best available data at the time. This world will be one in which TB control efforts make more effective use of existing resources to reduce the burden of TB, and thus fewer people will suffer and die from TB every day.

We have specific plans for achieving each of our three primary outcomes (see figure). In order to create **improved co-ordination, knowledge sharing and management within the TB community (Outcome 1)**, TB MAC has established a formal relationship with the WHO Global Task Force on TB Impact Measurement (WHO TF). The WHO TF will replace the TB MAC's Advisory Panel and will provide TB MAC with guidance on progress and for priorities for modelling, and provide a mechanism for gaining agreement among stakeholders on these priorities. These prioritised needs agreed with stakeholders at the WHO TF meetings, will be made known to the community of modellers, who will work together to use their capacity to answer the highest-priority and best-fit policy questions. The TB MAC website will be restructured to help provide the most efficient and effective communication between policymakers and modellers in this regard, and we will also create repositories of literature, data, and existing models for use by all parties. Ultimately, through these activities, we will create a forum for sharing ideas and communications between TB policymakers and TB modellers, with the result that policy decisions are more transparent, more data-driven, and ultimately more effective in reducing TB morbidity and mortality.

Figure: TB MAC Theory of Action



Our second primary outcome is to create new high quality modelling guidelines and resources (Outcome 2). To achieve this outcome, TB MAC will lead the new modelling stream for the WHO TF on TB disease burden, intervention impact and allocative efficiency, and create a "TB Modelling Research Group".

With WHO/GTB we will develop agenda and materials for annual TB MAC/WHO TF meetings including on TB disease burden, intervention impact and allocative efficiency, and develop global guidance on the development and application of country-specific models for assessment of allocative efficiency, which can be linked to WHO country epi-reviews. We will also contribute to agenda, lead development of background papers and present for annual meetings of the full WHO TF. For the Global Fund for AIDS, TB, and Malaria, we will generate modelling guidelines that can inform both epidemiological projections and estimates of cost-effectiveness and budget impact for country-specific Concept Notes. For WHO & GFATM, if funding for the workshops is forthcoming from GFATM, TB MAC will also develop and co-ordinate delivery of the modelling component of GF/WHO/TB MAC convened regional workshops. TB MAC will also develop a framework for measurement coverage and change in epidemiological indicator(s) and further develop and re-submit the *'Better evidence for resource allocation modelling funding proposal'*. We will also work with the TB modelling and economic community to develop human capacity in TB modelling, especially in high-burden countries. One of the greatest limitations to existing TB control efforts is the lack of individuals who understand both the rigorous quantitative methods required of mathematical models but also the epidemiological, economic, and political situation "on the ground" in key high-burden countries. We will therefore engage postdoctoral fellows and other trainees (with a focus on those from high-burden countries) in the full process from data to quantitative frameworks to decision making, with an aim of expanding the TB modelling community in this direction. We will foster efforts to link students, trainees, and senior modellers and economists on regular conference calls and less frequent in-person meetings to discuss major topics in TB modelling and economics, review key articles in the literature, and evaluate and improve participants' own work in a collaborative and "safe" environment. We will appoint outstanding individuals as "modelling ambassadors" to key TB policy meetings, which we can facilitate given our strong existing links to major TB policy and funding bodies.

Given that existing models struggle with common data gaps and limitations in our understanding, the TB Modelling Research Group will bring together modellers and other scientists and stakeholders to identify the biggest gaps in our current knowledge (i.e., what data or knowledge is both feasible to collect and would improve our existing ability to make impactful decisions). TB MAC will specifically address each priority area, creating an agenda for further data collection and modelling that can lead concretely to better models and decisions in the future. We will construct actual models to evaluate key Foundation priorities, including informing the development of new tools. In addition, the dissemination of key new data will be facilitated by TB MAC for rapid assimilation and use by modellers (see Appendix, Section 1 for more details).

Upon successful achievement of this outcome, TB decision-makers will have at their fingertips a wide array of models, modellers and economists that can be leveraged to answer priority policy questions, at the same time as the TB modelling community continues to create ever-improved tools that incorporate and motivate new data collection efforts.

Finally, we aim to develop better informed TA/decision making communities and modellers (Outcome 3). We will accomplish this by working with Technical Assistance agencies in a series of formal workshops that will help deepen those agencies' understanding of the utility and limitations of TB models, while also informing modellers and economists as to how they can adapt existing tools to make them more useful on the ground. We will create a series of training materials and better links to existing initiatives in health economics, so that decision-makers can have confidence that they are using the "state of the art" in available models while also informing modellers as to how the current suite of models and tools can be improved. We will also work collaboratively with teams that are actively designing more user-friendly modelling tools to help inform country-level decision-making. Thus, the investment in TB MAC will not only lead to a set of modelling tools that decision-makers can use and the links necessary for those models to be employed for decision-making, but it will also help to directly equip leaders to make those decisions that will lower the TB burden in their countries while optimising the use of their TB control resources.

In summary, we have a defined action plan that will enable us to rapidly accomplish three key objectives: 1) improved co-ordination, knowledge sharing and management within TB community, 2) New high quality modelling guidelines and resources, and 3) better informed TA/decision making communities and modellers. The accomplishment of these objectives will lead to a world in which TB decisions are driven by data rather than expert opinion, and by verifiable methods rather than obscure processes **– with the end result that TB resources will be put to their best use worldwide, TB epidemic fighting efforts will be improved, and the millions of individuals who would otherwise have developed or died from TB will live more fulfilled and healthier lives.**

As needed, describe why you believe the approach would lead to the desired results. Reference related work, existing evidence from evaluations or systematic reviews, and/or relevant experience, etc.

4. Risk Mitigation

As needed, describe any significant risks to the success of this project and how you plan to address them.

Activities are predominately low risk, as the build on, and strengthen, existing collaborations and activities from the previous TB MAC grant.
Although not critical to the success of this grant, the success of the two grants that this grant will inform (the *Costs data collection* and the *Better evidence for resource allocation decision making*, see Appendix 3) and the GFATM/WHO regional 'high priority country' data/modelling workshops are dependent on attracting additional funding. Funding candidates include BMGF, GFATM, USAID and World Bank.

5. How We'll Work Together

This question is intended to begin the dialogue on how foundation staff would work with you to achieve the intended outcomes. Topics could include minimal staff support, any specific issues that would likely need on-going discussion, regular communications, or other information to help establish mutual expectations and assist with implementing the proposed work.

We benefit from input from Damian by email and at Committee meetings.
Increased communication between this grant and the BMGF TB team would likely increase the value of this grant to the BMGF TB group, and continue to help align grant activities with the priorities of the BMGF TB group. A possible mechanism might be 2-monthly, 30 minute, calls with Daniel.

6. Geographic Areas to Be Served

List all countries and regions/states that would benefit from this work and associated dollar amounts. If areas to be served include the United States, indicate city and state. Add more rows as needed. More information about Geographic Areas to Be Served can be found here.

Location	Foundation Funding (U.S.$)
Global	$3,358,801
	$
	$

7. Geographic Location of Work

List all countries and regions/states where this work would be performed and associated dollar amounts. If location of work includes the United States, indicate city and state. Add more locations as needed. More information about Geographic Location of Work can be found here.

Location	Foundation Funding (U.S.$)
US	$1,169,144
UK	$2,126,407
Europe	$63,250

8. Intellectual Property

A. **We have identified intellectual property in this project. Please complete the Intellectual Property (IP) Report**

9. Activities

Describe in further detail what activities are necessary to produce the principal results. Please ensure that these activities align with the results in the Results Framework.

The principal result, **increased effectiveness and efficiency of TB control policy and practice at global and country level**, will be produced from activities leading to our three main interim outcomes (see figure):

1. Improved co-ordination, knowledge sharing and management within TB community
2. New high quality modelling guidelines and resources
3. Better informed TA/decision making communities and modellers

All recommendations from the external review of TB MAC, and in discussion with the Foundation and Stakeholders have been implemented in this set of activities. TB MAC activities are designed to be 'public goods' and (in general) do not fund specific modelling groups to carry out specific tasks, that could instead take the form of a bilateral contract between a funder and an individual modelling group for a specific piece of work. A more detailed explanation of the interrelation between 'public good' TB MAC activities & other bilaterally-funded activities is contained in Appendix, Section 2. Further, a summary of the interrelations and dependencies of the Global Health Cost Consortium, TB MAC, costs data collection and resource allocation grants/proposals is shown in Appendix, Section 3.

The major deliverables and their utility to key stakeholders are summarised in Table 1. The following text summarises how we will create these major, and other, deliverables.

Table 1: Summary of major TB MAC deliverables and utility to key stakeholders

Outcome # (see fig)	1	2	2	2	2	2	2	2	3	3
Stakeholder	Facilitation and linkage of decision makers and modelling groups	Modelling to inform policy guidance, including model details sharing	Knowledge-sharing on key data and methodological advances to support decision making	GF Concept Note and WHO modelling evidence submission guidelines	Co-ordinate WHO Task Force modelling stream	Review of and recommendation for data and models for allocative efficiency	Create framework for measurement of coverage and change in epi indicators	(If GF funded) co-ordinate modelling in regional WHO/GF workshops	Training of TA in use of models for policy making (model generic)	Case studies of best practices in TB modelling and model sharing
GF	x	x	x	x	x	x	x	x		x
WHO	x	x	x	x	x	x	x	x		x
PDPs	x		x							x
WB	x	x	x		x	x	x	x		x
USAID/ KNCV	x	x	x	x	x	x	x	x	x	x
NTP	x	x		x	x	x	x	x		x
Modellers	x	x	x	x	x	x	x	x	x	x
BMGF	x		x		x	x	x	x		x

To **improve co-ordination, knowledge sharing and management within the TB community (Outcome 1),** by the end of the grant period, we have established a formal relationship with the WHO Global Task Force on TB Impact Measurement (WHO TF). The WHO TF replaces the TB MAC Advisory Panel and will provide TB MAC with guidance on progress and for priorities for modelling, and provide a mechanism for gaining agreement among stakeholders on these priorities. Stakeholder needs agreed in the WHO TF meetings will be shared on a TB MAC website page and newsletters, and TB MAC web-pages will also contain pages or links to available TB models and teams, with summaries of what the models could be used for. **TB MAC communication** will also be improved by adding governance, funding, and deliverables to the website, adding the new Theory of Action figure, creating and adding case studies, updating the systematic literature review of all TB modelling studies, adding a webpage detailing all ongoing modelling work to prevent duplication of effort and to encourage synergy, and creating and disseminating a '*Modelling for Policymakers and Policymaking for Modellers'* booklet. This will be in addition to fostering improved communications at the meetings outlined below. We will also work with the Foundation to set up a call with the other modelling consortia to identify shared learnings, and evaluate the feasibility of supporting the development of (cross pathogen) country/regional modelling groups.

To create **new high quality modelling guidelines and resources (Outcome 2)**, by the end of the grant period, our activities will i) support the WHO Global Task Force on TB Impact Measurement and fill critical global TB and new tools/ product development modelling and data gaps, ii) identify and fill critical guideline gaps, and iii) submit cost data collection and resource allocation proposals and iv) produce modellers with capacity/incentives to create TB models. We will **support WHO TF and fill critical global TB and new tools/ product development and economic modelling and data** by **(i)** leading the new modelling stream within the WHO TF, and by creating the 'TB Modelling Research Group', with new tools/ product development, and economics themes. One meeting will be held each year combining efforts for the WHO TF and the TB Modelling Research Group. In these meetings and associated work, WHO TF modelling needs to support and improve country-level projections of TB disease burden, intervention impact and allocative efficiency will be met, critical global TB, new tools/ product development and economics modelling and data questions will be identified, and RFAs released to fund literature reviews, model building and grant application writing to fill the most critical of these gaps. With WHO/GTB we will develop agenda and materials for annual TB MAC/WHO TF meetings on TB disease burden, intervention impact and allocative efficiency. We will also contribute to agenda, lead development of background papers and present on TB disease burden, intervention impact and allocative efficiency, for

annual meetings of the full WHO TF. For WHO & GFATM, if funding for the workshops is available from GFATM, TB MAC will also develop and co-ordinate delivery of the modelling component of GF/WHO/TB MAC convened regional workshops. On the costs side we will carry out a review to add service/ systems costs into TB models, define the requirements for unit costs and cost functions for use in TB models, and link TB MAC to the to Global Health Costing Consortium (GHCC) and iDSi. To **identify and fill critical guideline gaps (ii)**, we will create modelling guidelines for GFATM that can inform both epidemiological projections and economic estimates of cost-effectiveness and budget impact for country-specific Concept Notes, and we will create global guidelines for WHO on the development and application of country-specific models for assessment of allocative efficiency, that can be linked to WHO country epi-reviews. We will **input into cost data collection and resource allocation proposals (iii).** We will help identify cost data gaps with the GHCC to specify the work program for the TB costs data collection proposal (PI Anna Vassal). We will develop a framework for measurement coverage and change in epidemiological indicator(s) and further develop and re-submit the *'Better evidence for resource allocation modelling funding proposal'*. We will generate **more modellers with capacity/incentives to create TB models (iv)** by improving modeller access and visibility to policy makers, giving better access to modelling materials and training, continuing to offer open and transparent funding opportunities, including funds to attend modelling meetings.

To deliver **better informed TA/decision making communities and modellers (Outcome 3)**, we will run activities to support TA/global level decision makers. We will work with TA agencies in a series of formal workshops. We will create a series of training materials and better links to existing initiatives in health economics. We will also work collaboratively with teams that are actively designing more user-friendly modelling tools to help inform country-level decision-making. To support country level decision makers, we will continue to apply to run the Introductory TB Modelling course at the Union conference each year, and create training materials for workshops with TA agencies (such as KNCV). We will also make The Union course material available online to maximise the number of people who can benefit from it, and send regular newsletters. For global level decision makers, we will run modelling workshops, and fund 'Modelling Ambassadors' to attend policy meetings as requested by global policy makers.

We will also carry out activities **to improve TB MAC governance, Secretariat, transparency/inclusivity and sustainability, and internally and externally evaluate our progress**. We will carry out an annual external audit of project spending on RFAs and Direct Commissions. We will add summaries of governance, the RFA assessment and award procedure, list members of Committee and WHO TF and add their terms of reference to the website. The Secretariat will submit routine updates on the status of RFAs and projects to the Committee and WHO TF, covering sub-grant status, progress against milestones and deliverables, and interim/final scientific review status (reports will make clear how sub-grants relate to RFAs or whether they are direct, and whether any of the sub-grants in turn have their own sub-grants or cover multiple projects). TB MAC will also publish a short annual report of activities, including descriptions of the sub-grants, their progress and achievements. Short summaries of all TB MAC's RFAs and funded projects will be included on its website, with links to deliverables as they are produced. We will add assessment criteria to TB MAC RFA/DCs (Direct Commissions) on whether application led by or include developing world partner(s). We will keep the standing core committee (including, but not limited to Drs. Cohen, Vassall, Eckhoff, Dowdy, Kimerling, Menzies and White), but rotate in other key TB modellers for 6-12 months. We request the flexibility to add another Committee member with currently unavailable experience (e.g. optimisation or operational research). We will advertise for volunteers to identify candidates and optimise the committee size. A baseline and final external evaluation will be carried out, and TB MAC will continue to develop co-funding from other institutions and we will review TB MAC sustainability towards the end of the grant period.

We will **increase participation from partners in the developing world**. This will include actively seeking developing world meeting attendees, and adding an assessment criterion to TB MAC RFA/DCs on whether applications are led by, or include, developing world partner(s), as was successfully piloted in the last RFA under our previous grant.

10. Organizational Capacity

Describe any changes or improvements you plan to make to your organization's capacity to undertake or achieve the outcomes of the proposed investment.

We request to fund more junior-level individuals, including Drs Menzies, Gomez, and postdoctoral fellows, to perform specific pieces of work for TB MAC. Based on the recommendations of the external review of TB MAC and more recent discussions with the WHO/GTB, TB MAC governance/ management structures will be improved in the following ways:

Governance

- An annual external audit of project spending on RFAs and Direct Commissions has been added.
- The 'RFA/Direct commission process': The existing process will be reviewed at start of renewal, e.g. consider a $15k cap on direct commissions (DC). Our aim is that external parties are confident that all funding is allocated in an open and transparent way.
- We will co-convene an in-person stakeholders meeting early in year 1 with the WHO TF

Transparency/inclusivity

- Overviews of governance, the RFA assessment and award procedure, list members of Committee and WHO TF and add their terms of reference to the website.
- Secretariat will submit routine updates on the status of RFAs and projects to the Committee, covering sub-grant status, progress against milestones and deliverables, and interim/final scientific review status. Reports will make clear how sub-grants relate to RFAs or whether they are direct, and whether any of the sub-grants in turn have their own sub-grants or cover multiple projects.
- TB MAC will publish a short annual report of activities, including descriptions of the sub-grants, their progress and achievements.
- Short summaries of all TB MAC's RFAs and funded projects are included on its website, with links to deliverables as they are produced.
- Add an assessment criterion to TB MAC RFA/DCs on whether applications are led by, or include, developing world partner(s).

Project Management

- Project management training for project coordinator.
- We will add utility metrics to selected TB MAC deliverables agreed a-prior with key stakeholders

Committee and Advisory Panel

- The TB MAC Advisory Panel will be replaced by the WHO Task Force on TB Impact Measurement (WHO TF)
    - The WHO TF will provide TB MAC with guidance on progress and for priorities for modelling, and provide a mechanism for gaining agreement among stakeholders on these priorities

- Leadership, advocacy and management tasks have been distributed amongst Committee as shown in the activities above.
- Keep the standing core committee. Add another Committee member with currently unavailable experience (e.g. optimisation or operational research). Rotate in other key TB modellers for 6-12 months tenure. Advertise for volunteers in order to transparently identify candidates.

Project evaluation and sustainability
- Baseline and final evaluation.
- Facilitated internal evaluation discussions.
- Sustainability review

11. Organizational Fit

What experience does your organization have to implement the proposed work?

Project lead organisation, and collaborators, have been leading TB MAC for the past 4 years.

12. Beneficiaries

Who would benefit from this investment?

This work will reduce the global burden of TB by increasing the effectiveness and efficiency of TB control policy and practice at global and country level. Direct beneficiaries include global decision-making agencies, country-level decision makers, and technical assistance agencies. The ultimate beneficiaries are the global general population, particularly populations in high TB burden countries.

13. Critical Relationships

Describe any critical relationships with other partners or projects that may influence this work (or that this work may influence).

Our work is relying heavily on good working relationships with our key stakeholders (as summarised in section 2). These will be strengthened in the current grant period by a more active and formalised advisory panel such as the link with the WHO TF.

14. External Factors

Describe any external factors that may influence the success of this investment.

This grant will be influenced by global and country funding and capacity constraints, which are largely beyond the influence of TB MAC.

15. Sustainability

Describe the vision of the long-term sustainability of this project beyond the proposed time frame and funding with consideration to economic/financial, organizational, or behavioral factors.

We envision TB MAC to be co-funded from multiple sources in the future. There is ongoing discussion of co-funding of the '*Better evidence for resource allocation decision making*' piece and meetings with the WHO TF. We will also continue to identify additional co-financing from key funders for work within TB MAC's mandate.

16. Measurement and Evaluation

Describe your plan for monitoring and evaluation of the outputs and outcomes you identify in the Results Framework & Tracker that accompanies your Proposal Narrative. Specifically address:

1. The learning/evaluation questions for this investment and how you plan to answer them through monitoring and/or evaluation;
2. The resources (financial, technical, human) you need to ensure high quality monitoring and/or evaluation data; and
3. If you are planning a formal evaluation, describe when it will be conducted during the grant, who will conduct it (external/third party or not), the methodology you will consider, and how the main evaluation audiences will use the findings.

See the foundation's evaluation policy as a point of reference.

Proposed indicators are shown in the Results Framework.
A baseline evaluation was carried under the previous grant, and an interim and final evaluation will occur midway and in year 3 of the proposed grant.
Utility metrics will be added in an F2F meeting with stakeholders early in year 1 of the grant.

17. Clinical Studies and Regulated Research

A. Would the investment involve any of the following?

- **Human subjects research**, including **Clinical trials**
- Genetically modified organisms (plants or animals)
- Biohazards
- **Pathogens/toxins identified as select agents by U.S. Law**

If yes, complete the Clinical Studies and Regulated Research Module.

If no, please acknowledge by typing "N/A": _____

18. Data Access

We anticipate this investment, if funded, would generate datasets that may be of interest to the foundation and/or to the field if made publically available. Please describe any datasets that will be generated as part of this investment. Specifically address when and how the datasets would be made available to the foundation and/or to the public, in what form or format, and any anticipated costs to your organization. Additional information about Data Access can be found here.

We do not expect collection of primary empirical data. However, some model data sharing may be required. If so it will be shared within one year of generation or with publication, whichever is sooner.

19. Advocacy & Lobbying

US law prohibits foundation funds from being earmarked to support direct or grassroots lobbying communications. Describe how you will conduct this project in compliance with these rules, as summarized in the Advocacy Guidelines Handout, and any other relevant local, state, or non-US lobbying laws. If foundation grant funds will be earmarked to influence policies, budgets, innovations, frameworks, action plans, etc., that could require a legislative vote, please explain how such "legislative" activities will be conducted in accordance with the applicable rules and exceptions. Your explanation should address both direct and grassroots communications.

We will follow guidance as summarised in the Advocacy Guidelines Handout.

Budget Narrative

The purpose of the budget narrative is to supplement the information provided in the excel-based budget template by justifying how the budget cost elements are necessary to implement project activities and accomplish target outcomes. The budget narrative is a tool to help foundation staff fully understand the budgetary needs of the project and is an opportunity to provide descriptive information about the costs, drivers, and risks that can't be easily communicated in the budget template. Together, the budget narrative and budget template should provide a complete quantitative and qualitative description that supports the proposed budget. The description provided in the budget template should be very brief. Please use this budget narrative to provide a thorough description of your budget and only complete questions that are relevant to your grant proposal.

For Global Development, Global Health and Global Policy and Advocacy related grants: If your proposal includes any sub-contracts and/or sub-grants greater than $1 million USD, please complete a separate budget template and narrative for each organization.

For U.S. Programs, Communications and Family Interest related grants: If your proposal includes any sub-contracts and/or sub-grants greater than $250,000 USD, please complete a separate budget template and narrative for each organization.

1. Summary

Please explain the major cost drivers and how costs relate to planned activities and target outcomes. Also explain any potential risks in spending as budgeted and any plans to mitigate those risks.

If budgeting by outcomes, or additional dimension, please explain the major cost drivers per outcome or other relevant dimension.

Overall, compared to the previous TB MAC award (OPP1084276), as requested by the Foundation, we have included all meeting costs in this core TB MAC proposal. Previously TB MAC meeting costs were paid from a separate BMGF budget, and amounted to ~$1M for 7 large meetings over 3 years. This is the primary reason for the higher annual cost of this proposal budget vs OPP1084276.

In very brief summary, to achieve the proposed impact we request $1,194,424 (36%) for personnel, $743,000 (22%) for travel and meetings, $60,000 (1.7%) for consultants, $48,250 (1.3%) for other direct costs, $875,023 (26%) for sub-awards and $438,105 for indirect costs (13%).

For each outcome, our funding spread is as follows (excluding overheads) – outcome 1 (Improved co-ordination, knowledge, sharing and management) - $501,083 17%, outcome 2 (New high quality modelling guidelines and resources) - $1,666,447; 57%, outcome 3 (Better informed modellers and TA / decision making communities) - $427,083; 15%, outcome 4 (Governance and evaluation) - $326,083; 11%

The increase in the proportion of costs allocated to personnel compared to our previous award reflects the decision made during the TB MAC evaluation and review discussions (and reflected in the TB MAC Theory of Action), to reduce (but not eliminate) funds allocated to unspecified projects, and increase funds for directly employed staff to carry out our pre-identified activities. This is a reflection of the maturity of TB MAC – we have identified critical gaps and have allocated resources to filling them. Details below.

2. Personnel and Benefits

Personnel: Provide a brief explanation of personnel budgeted, including responsibilities as they relate to the grant. Also include assumptions made for any staff budgeted which are to-be-hired, including salary estimates for these personnel.

To achieve the proposed impact, we request the following personnel costs:

Richard White – Project PI, is a member of TB MAC Secretariat, and Chair of the TB MAC Committee. He is ultimately responsible for grant co-ordination, quality and delivery of all activities will participate in discussions with policymakers and high-level meetings. He will co-lead (with Cohen) liaison with the WHO TF, developing the overall agenda for the annual TB MAC/WHO TF meetings and the modelling component of the annual full WHO TF meetings. He will create the agenda for the 6-mthly calls with the WHO TF and for the in-person stakeholder meeting early in year 1, creation of webpages with models and WHO TF-agreed stakeholder 'asks', expert advice to stakeholder calls process, cross-BMGF consortia liaison, TB Modelling Research Group Vaccines subgroup, input into the Resource Allocation proposal, the Union meeting post-grad training, sending modelling Ambassadors to meetings process, and Governance activities. He will contribute expert advice on calls to TA working with country level modellers & global stakeholders. He will directly supervise Rein Houben, the Secretariat Project Admin coordinator, and the Secretariat Epidemiologist. (LSHTM, 75% FTE, 3 years XXX),

Anna Vassall - Project Co-PI, is a TB MAC Committee member (responsibilities as detailed in Committee TOR), and will lead the economic activities across the grant including co-leading (with Menzies and Gomez) the TB Modelling Research Group Economics Theme, linking TB MAC to iDSi and the GHCC, inputting to the costs data collection proposal, and will directly supervise Gabriela Gomez. She will contribute expert advice on calls to TA working with country level modellers & global stakeholders (LSHTM, 10% FTE, 3 years XXX).

Rein Houben - Project Co-PI, is a member of TB MAC Secretariat will lead the WHO TF focused activities, including developing agenda and coordinating material creation for the WHO TF focused component of the 3 annual TB MAC/WHO TF meetings. He will co-lead (with Menzies) creation of the GF and WHO concept note guidelines, the modelling for allocative efficiency review and recommendations, the historic case studies, the 'Modelling for Policy' booklet, and the training of global stakeholders/TA. If funding is forthcoming, he will also develop and co-ordinate delivery of the modelling component of GF/WHO/TB MAC convened regional workshops. He will teach on the annual Union modelling post grad course, co-write the materials for the training of global stakeholders/TA and train the global decision makers/TA. He will lead the epi component of the framework for measurement coverage and change in epidemiological indicator(s), the resource allocation funding proposal, and lead the updating of the modelling literature review. He will contribute expert advice on calls to TA working with country level modellers & global stakeholders (LSHTM, 40% FTE, 3 years XXX).

David Dowdy - Project Co-PI, is a TB MAC Committee member (responsibilities as detailed in Committee TOR) and will lead the TB Modelling Research Group (including developing agenda and coordinating material creation for the TB Modelling Research Group component of the 3 annual TB MAC/WHO TF meetings and associated RFAs). He will input into framework for measurement coverage and change in epidemiological indicator(s) and the resource allocation funding proposal. He will directly supervise the TBA modeller at Johns Hopkins. He will contribute expert advice on calls to TA working with country level modellers & global stakeholders (Johns Hopkins, 15% FTE for year 1, 10% FTE for years 2 & 3 XXX).

Ted Cohen - Project Co-PI, is a TB MAC Committee member (responsibilities as detailed in Committee TOR). He will co-lead (with White) liaison with the WHO TF, developing the overall agenda for the annual TB MAC/WHO TF meetings and the modelling component of the annual full WHO TF meetings. He will contribute expert advice on calls to TA working with country level modellers & global stakeholders (Yale, 20% FTE, 3 years $ XXX).

Philip Eckhoff - Project Co-PI, is a TB MAC Committee member (responsibilities as detailed in Committee TOR). He will contribute expert advice on calls to TA working with country level modellers & global stakeholders (IDM, 20% FTE, 3 years $ XXX).

Michael Kimerling - Project Co-PI, is a TB MAC Committee member (responsibilities as detailed in Committee TOR). He will contribute expert advice on calls to TA working with country level modellers & global stakeholders (KNCV, 10% FTE, 3 years $ XXX).

Nick Menzies - Project Co-PI (Epi/Economist), and TB MAC Committee member (responsibilities as detailed in Committee TOR), will co-lead (with Vassall and Gomez) the TB Modelling Research Group Economics Theme and conduct analytical work to support this theme, co-lead (with Houben) creation of the GF and WHO concept note guidelines, the modelling for allocative efficiency review and recommendations, the historic case studies, the 'Modelling for Policy' booklet, and the materials and the training of global stakeholders/TA. He will teach on the annual Union modelling post grad course, co-write the materials for the training of global stakeholders/TA and train the global decision makers/TA. He will lead the econ component of the framework for measurement coverage and change in epidemiological indicator(s), the resource allocation funding proposal. He will contribute expert advice on calls to TA working with country level modellers & global stakeholders. (Harvard, 30% FTE, 3 years $ XXX). He will be supported by a team member from Harvard's grant management team (2% FTE for 12 months, $ XXX, and has other direct costs totaling $ XXX. Total sub-award to Harvard is $ XXX).

Gabriela Gomez – Project Co-PI (Epi/Economist), will co-lead (with Vassall and Menzies) the TB Modelling Research Group Economics Theme and conduct analytical work to support this theme, strengthen the links between economists and modellers, teach on the annual modelling post grad course, contribute to the creation of materials and the training of global stakeholders/TA. She will contribute expert advice on calls to TA working with country level modellers & global stakeholders. (LSHTM, 20% FTE, 3 years $ XXX)

TBA Secretariat Epidemiologist – will be a member of the TB MAC Secretariat, will assist Houben in creating materials for the WHO TF focused component of the 3 annual TB MAC/WHO TF meetings, creation of the GF and WHO concept note guidelines, the modelling for allocative efficiency review and recommendations, the historic case studies, the 'Modelling for Policy' booklet, and the training of global stakeholders/TA. If funding is forthcoming, s/he will also assist Houben in developing and coordinating delivery of the modelling component of GF/WHO/TB MAC convened regional workshops. S/he may also teach on the annual Union modelling post grad course, co-write the materials for the training of global stakeholders/TA and train the global decision makers/TA. S/he will assist Houben in leading the epi component of the framework for measurement coverage and change in

epidemiological indicator(s), the resource allocation funding proposal, and carry out the modelling literature review. S/he will also help the PI to co-ordinate the scientific activities across the grant (LSHTM, 100% FTE, 3 years $ XXX).

TBA, Economist RA, will support the organization and outputs of the TB MAC economics work on the grant including creation of the GF and WHO concept note guidelines, the modelling for allocative efficiency review and recommendations, the historic case studies, the 'Modelling for Policy' booklet, the materials and the training of global stakeholders/TA, teaching on the annual Union modelling post grad course, help train the global decision makers/TA (LSHTM, 50% FTE research assistant, 3 years $ XXX).

TBA, Epi Modeller, will carry out literature reviews and modelling studies to support the TB Modelling Research Group (Johns Hopkins, research assistant, 30% FTE, 3 years $ XXX).

TBA additional Committee Member – will be a TB MAC Committee member (responsibilities as detailed in Committee TOR). S/he will contribute expert advice on calls to TA working with country level modellers & global stakeholders (Organisation TBA, 10% FTE, 3 years $ XXX).

Christina Albertsen or Kristian Godfrey (only one of these), Project Coordinator (Admin), member of the TB MAC Secretariat will carry out project administration and redesigning the TB MAC website and regularly update it with ongoing modelling work, jobs, RFAs, model descriptions. S/he will also carry out meetings logistics, and monitor financial reports and deliverables reports for project. (LSHTM, 100% FTE, 3 years $ XXX).

Benefits: Describe the components of the benefits (column R of the "Budget Details" sheet) included with the salary costs. For example: pension, health insurance, expatriate costs, etc.

LSHTM salaries include National Insurance, and Pension contributions.

3. Travel

Provide rationale for the travel budgeted and assumptions used to determine appropriate number of trips and personnel required. Also include a brief rationale for how travel costs were estimated.

To achieve the proposed impact, we request the following travel costs:

We request funds to create **new high quality modelling guidelines and resources (outcomes 2).** To **support the WHO Global Task Force on TB Impact Measurement and fill critical global TB and new tools/ product development modelling and data gaps,** we request funds to convene 3 large annual meetings ($390,000 – 1 group meeting per year, $130,000 per meeting = $80,000 for travel and subsistence, $55,000 for venue hire and accommodation, 40-50 attendees, including some of, but not limited to – Richard White, Rein Houben, Gaby Gomez, Anna Vassall, Christina Albertsen, TBA economist, and TBA Senior epidemiologist, David Dowdy, Michael Kimerling, Ted Cohen, Nick Menzies, Katherine Floyd). These funds will also be used to send modelers to the annual full WHO TF meeting if required. To support additional attendance of experts for side meetings for diagnostics and vaccine modeling sub-groups in year 2 (outcome 2), we request $80,000 (2 sessions, 1 per subgroup @ $40,000 per session ($24,000 for travel and subsistence, $16,000 for accommodation, approx. 30 attendees, including some of, but not limited to – Richard White, Christina Albertsen and TBA Senior epidemiologist and some off Rein Houben, Gaby Gomez, Anna Vassall, TBA economist, and David Dowdy, Michael Kimerling, Ted Cohen, Nick Menzies, Katherine Floyd).

We request funds to deliver **better informed TA/decision making communities and modelers (outcome 3).** To convene modeling workshops with TA agencies and Global decision makers we request $60,000 (1 session per year, @ $20,000 per session = $15,000 for travel and subsistence, $5,000 for venue hire and accommodation, ~15 attendees, including, but not limited to Rein Houben and Nick Menzies), to run the Introductory TB Modelling course (outcome 3) each year we request $30,000 (1 course per year, $10,000 per course = $2,000 for venue hire, $7,500 travel, $500 for creation and printing of materials, 25-30 attendees, approx., including some of, but not limited to – Richard White, Rein Houben, Anna Vassall, Gaby Gomez, Christina Albertsen), and we request $36,000 (1 person, 4 meetings per year, $3,000 per trip = $2,000 for travel and subsistence, $1,000 for accommodation) to send Modelling Ambassadors to policy meetings (outcome 3, names to be decided during grant).

We also request funds **to improve TB MAC governance, Secretariat, transparency/inclusivity and sustainability and internally and externally evaluate our progress (outcomes 1-4).** To allow the stakeholders, Committee, Secretariat and the evaluator and facilitator to meet and attend the in-person Stakeholder meeting early in year 1 and critical policy, technical and evaluation meetings throughout the grant we request $150,000 (10 trips per year @ $5000 for travel & accommodation & expenses per trip = $50,000 per year * 3 years, 8-10 attendees, including some of, but not limited to - Richard White, Rein Houben, Anna Vassall, Christina Albertsen, David Dowdy, Michael Kimerling, Ted Cohen, Nick Menzies, Katherine Floyd).

4. Consultants

Provide a brief description of the work to be performed by consultants in support of the overall project and describe any expenses that have been included.

To achieve the proposed impact, we request the following consultant costs:

To improve **TB MAC communication (outcome 1.ii)**, we request funds to redesign and maintain the TB MAC website ($20,000). To improve **TB MAC governance, Secretariat, transparency/inclusivity and sustainability and internally and externally evaluate our progress** (outcome 4) we request funds for David Collier to carry out the external evaluation of TB MAC ($XXX) and the 3 annual RFA expenditure reviews (3 XXX), and for Theresa Mellon to act as external facilitator to carry out the review of the grant, at grant end ($XXX).

5. Capital Equipment

Provide a brief justification and description of any items required for the project with a unit cost of greater than $5,000 (USD) and a useful life of more than one year.

None

6. Other Direct Costs

Provide a brief description and rationale for other direct costs required, including cost assumptions used to develop the budget for these costs.

To achieve the proposed impact, we request the following other direct costs:

To create **fill critical global TB and new tools/ product development modelling and data gaps (Outcome 2.i)** we request funds to commission literature reviews, model building and grant application writing to fill the most critical of these gaps (RFA funds) ($300,000 – $100,000 per year for 3 years). These will be in the form of sub-awards and are in the budget spreadsheet here, but as we do not yet know who they will be awarded to, we are unable to give details of entities.

To ensure **better informed TA/decision making communities and modellers (Outcome 3)** we request funds to design and print materials for the TA training workshops ($5,000) and funds to design and publishing a 'Modelling for Policymakers and Policymaking for Modellers' booklet ($10,000).

To improve **TB MAC communications, governance, Secretariat, transparency/inclusivity and sustainability and internally and externally evaluate our progress (outcome 4)**, we request communications funds for the project overall (Skype calls, conference calls, mobile phone calls, office phones, overseas wifi and internet, overseas room hire) ($20,000) and $7,000 for computing hardware (3.5 laptops @ $2,000 = $17,000; one printer @ $500 and 5 hard drives @ $100 = $500). For general (printer cartridges, miscellaneous printing, overseas bank charges for payments to sub-contractors, software licences, paying for publications and other costs) - $1,000 per year = $3,000. Open access publication funds will be requested from the central BMGF fund.

7. Sub-awards

List all sub-grantees or sub-contractors involved in this investment. (Add more rows as needed)

Name	Corporate Entity Name (if applicable)	Mailing Address
Johns Hopkins Bloomberg School of Public Health		615 North Wolfe Street, Baltimore, MD 21205, USA
Yale School of Public Health		60 College Street, PO Box 208034 New Haven, Connecticut, USA
Harvard University		Massachusetts Hall, Cambridge, MA 02138, USA
World Health Organization		Avenue Appia 20, 1211 Geneva 27, Switzerland
Theresa Mellon	TM Training and Consultancy	XXX
David Collier	White Ox	XXX

If separate budgets are required (see above), please also submit a separate budget template and narrative for each sub-award.

Describe the work each organization is going to perform as well as the rationale for each organization chosen to participate on this project as a sub-grantee or sub-contractor. If organizations are TBD, include the assumptions used to estimate cost for the sub-award and the process and timeline you will be using to select these organizations.

Note: You will be required to submit the sub-award budget once final.

8. Currency Exchange

Briefly describe any foreign currency exchange exposure with this investment. Which costs included in the budget are exposed to exchange risk? How much do these costs total?

Costs paid in currencies other than US$ are subject to currency exposure. These are primarily salary expenditure for UK and European staff (cost: $1,249,425 before overheads). As required by LSHTM Research Operations Office, the recent sharp fall in the UK exchange rate due to Brexit uncertainty have not been fully priced in to protect this project against $/£ volatility over the next 3 years (1.5$/£ used).

9. Other Sources of Support for this Project

If you are requesting funding from the foundation for only a portion of this project and will depend on funds from other sources, please describe your contingency plans if full project funding does not become available. If you have applied for funding from other sources which overlap with the funding requested in this proposal, please indicate the nature and timing of that potential funding. Any expected in-kind contributions (e.g. drug donations, personnel time) should be included in the description.

NOTE: Names of the other sources and their expected dollar ($USD) contributions should be included on the 'Financial Summary & Reporting' sheet of the budget in the Funding Plan table.

N/A

10. Other

Please feel free to use this section to provide any other commentary or information that helps to describe and justify the budget request presented. This may include assumptions and rationale behind indirect costs, risks, anomalies or other assumptions foundation staff should be aware of when reviewing the budget.

An informal CN was sent for comments in Sept 2015. The 2nd CN was approved in June 2016. The first formal submission to BMFG was submitted in July 2016. This version has been revised based on further comments from BMGF/Other stakeholders received in Aug 2016.

Appendix

1) How and what data are being used to inform TB MAC, and how will TB MAC facilitate the use of these data by modellers?

The aim of this section is to summarise how and what data are being used to inform TB MAC, and how TB MAC will facilitate the use of these data by modellers. A summary table of the grants of committee members, has been created.

- One of the primary goals of TB MAC is to maximize the use of available data to improve our understanding of TB transmission and control, in order to develop models that can more appropriately inform additional data collection efforts and better policy decisions. As an example of how TB MAC can play this role, we draw on our experience in South Africa. For example, South Africa has an array of district-level and sub district-level TB surveillance data that are available (as an example, our collaborators in South Africa directly abstracted data on TB incidence by age, sex, and location in four sub districts as part of an earlier grant to model TB vaccines), and we also have access to data from a variety of clinical trials (some of which are funded by the Gates Foundation) - which can inform estimates of intervention costs and the speed of treatment initiation. These data have and will be used to inform models of potential impact of improved TB diagnostic and treatment algorithms in South Africa, as well as the cost-effectiveness and impact of new tools and interventions.
- While the modelling itself is carried out by individual groups, TB MAC will advertise the need for such a model, link those constructing the model with epidemiologists who are collecting relevant data (so that the most updated data are utilised), bring data from the model to a wider forum of modelers who could discuss the implications and provide feedback for model refinement, and facilitate the linkage of model results directly to policymakers who are making relevant decisions (e.g., developing a National Strategic Plan for TB) through such activities as the BMGF supported South African Govt "TB Think Tank" (PI: White, #OPP1110334). Examples of potential additional efforts could include: (a) ensuring that modelers looking at new interventions for diagnosis and treatment of paediatric TB are aware of, and understand the analytic methods used in making, new estimates of paediatric TB burden; (b) linking with other agencies (e.g., U.S. CDC) who are funding models for specific in-country purposes in order to bring insights from those modelling efforts to a broader forum of modelers; and (c) exploring evidence-based estimates from emerging models of the potential impact of new tools (e.g., new drug regimens) to evaluate the assumptions and methods made, bringing together a diverse group of modelers to offer critical review and provide recommendations for how to better refine and disseminate these estimates in the future.
- This section will be updated to incorporate translation of information from studies funded by BMGF but unknown to the TB MAC Committee, when information is received from BMGF.

2) Summary of separation, and interrelation, between proposed TB MAC activities and other activities of TB MAC Committee members and funders

The aim of this section is to summarise the separation, and interrelation, between the proposed TB MAC activities, vs activities funded by other grants of TB MAC Committee members or other funders, particularly GFATM, WB and USAID.

TB MAC activities are designed to be 'public goods' and (in general) do not fund specific modelling groups to carry out specific tasks, that could instead take the form of a bilateral contract between a funder and an individual modelling group for a specific piece of work. These TB MAC 'public good' activities are summarised in Table 1 in section 9 (Activities).

Two other areas of work are highlighted below to make interrelation between 'public good' TB MAC activities & other bilaterally-funded activities clearer:

1. GFATM, USAID, WB and countries have all identified improving modelling for within-country resource allocation decision making as a priority.
    - To meet this need, LSHTM, Harvard, Hopkins and partners have identified critical public goods that need to be created. There are contained in a separate funding application outline:
        - Framework for activity coverage measurement and change in epidemiological indicator(s) **(TB MAC will complete this item under the TB MAC grant; subsequent deliverables are dependent on further funding as require data collection)**
        - Empirical estimates for 7 activities in 2 countries
        - Estimation of change of relationship with coverage level
        - Estimation of uncertainty bounds
        - Framework for operational data collection
        - Generalisation and dissemination
    - By also investing in these elements, GFATM and BMGF would be co-financing the creation of these critical public goods.
    - GFATM, USAID and WB are also expected to continue bilateral funding of country groups, TA organisations such as KNCV, and individual modelling groups, to apply modelling frameworks to resource allocation decision making, eg using OPTIMA TB, TIME, or other models. However, to be fit for purpose, these efforts rely on successful completion of the critical public goods identified in the separate funding application. Together countries can better prepare for the GF 'Transition' over the current Replenishment period.
2. There are a number of other public goods that are required by many modellers and Global Stakeholders working to inform country level decision making. TB MAC will create these public goods. These include:
    - The framework for activity coverage measurement and change in epidemiological indicator(s) **(Deliverable 1 in this proposal)**
    - Annual meetings bringing together modellers, funders, TA organisations to discuss key issues such as model optimisation, and translation of modelling evidence to impact on national policy & practice
    - Development of Modelling Evidence Submission Guidelines for use by GFATM, WHO and countries
    - Generic (not model specific) model training workshops for TA organisations (to support countries) and courses for country NTPs at Union conference
    - Creation of Modelling to support Policy guidance and model details sharing

3) Summary of the interrelations and dependencies of the GHCC, TB MAC, costs data collection and resource allocation grants/proposals

- The funding status, aims, objectives, and main interrelations/dependencies are shown in the Table. In summary, the GHCC aims to systematically improve the quality, timing, local relevance, interpretation, and use of cost information on HIV and TB, TB MAC aims to increase the effectiveness and efficiency of TB control policy and practice at global and country level, the cost data collection proposal aims to collect TB cost to be used in financing and priority setting for TB, and the resource allocation proposal seeks to collate and collect better epidemiological evidence to inform within-country TB resource allocation models and decision making. The key interrelations/dependencies are shown in the Figure. The GHCC and TB MAC will meet to finalise the cost data gaps needed by the cost data collection proposal (this meeting is a deliverable in year 1 of the TB MAC grant), and the GHCC will also set the standards for the cost data collection proposal. TB MAC will also create the 'framework for activity coverage measurement and change in epidemiological indicator(s)' (Deliverable 1 in the 'TB resource allocation' proposal) and, subject to funding for the rest of this proposal, input into the identification of data gaps and the conceptual framework in this work. The data collated/collated by the GHCC, the cost data collected proposal, and epidemiological data collated/collected in the resource allocation proposal, will be used in the resource allocation grant to improve resource allocation modelling, to improve resource allocation decision making at county and global level. In addition, once GHCC, cost data proposal and resource allocation proposal products have been delivered, TB MAC will disseminate these resources to the TB modelling community to maximise the uptake of these products.

Figure. Relationships between GHCC, TB MAC, cost data collection and resource allocation grants/proposals. Arrows highlight major dependencies/ interrelations

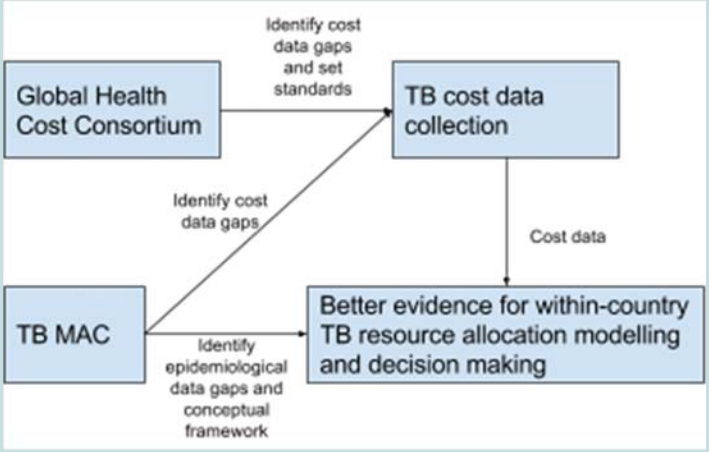


Table. Summary of GHCC, TB MAC, costing data collection and resource allocation grants/proposals

	Global Health Cost Consortium	TB MAC	TB cost data collection	TB resource allocation
Status	Funded by BMGF	First full proposal reviewed, revised concept note reviewed. Second proposal under review with BMGF (Damian Walker)	Proposal submitted to BMGF (Damian Walker)	Concept note under review by BMGF and shared with USAID and GFATM (Damian Walker)
Period	2015-2018	Jan 2017-Dec2019?	2017-?	2017-2020?
Aim	Systematically improve the quality, timing, local relevance, interpretation, and use of cost information on HIV/AIDS, and TB	TBD Increased effectiveness and efficiency of TB control policy and practice at global and country level	Collect TB cost data to be used in financing and priority setting for TB	Collate and collect better epidemiological evidence for within-country TB resource allocation models and decision making
Objectives	1) Extract, collate and analyse existing cost data sets in order to provide accessible cost estimates of HIV and TB services; and make these data publicly available 2) Conduct analyses including: development of cost functions within and across countries 3) Produce standards, guidance and methods for high quality and efficient cost data collection	TBD 1) Improved co-ordination, knowledge sharing and management 2) New high quality modelling guidelines and resources 3) Better informed TA/decision making communities and modellers	1) TBD, but filling key cost data gaps (see below) and 2) TBD, building a network of LMIC based economists with capacity to cost TB services	1) Framework for activity coverage measurement and change in epidemiological indicator(s) (**TB MAC will complete this item under the TB MAC grant; subsequent deliverables are dependent on further funding as require data collection**) 2) Empirical estimates for 7 activities in 2 countries, 3) Estimation of change of relationship with coverage level, 4) Estimation of uncertainty bounds, 5) Framework for operational data

				collection, 6) Generalisation and dissemination
Dependencies/interrelations	TB MAC/GHCC to hold joint meeting to identify and prioritise cost data gaps and needs (planned for first year of TB MAC grant) TB MAC to contribute to any user evaluation of GHCC products	TB MAC facilitates knowledge sharing from 3 other grants/proposal to and from the TB epi modelling community	TB MAC/GHCC hold joint meeting to identify and prioritise cost data gaps and needs (cost functions etc.) (planned for first year of TB MAC grant) GHCC develops standards and methods to collect cost data (standards set in first year of GHCC, methods developed year 2)	Costs/cost-functions: This work would build on the data collation/collection and methodological work done in the GHCC and cost data collection work. It was recognised that costing work is a critical need for resource allocation models. However, costing work was kept out of this grant to avoid overlap with GHCC and cost data collection projects/applications. Methodological input/dissemination: TB MAC is likely to play a role in facilitating discussions about e.g. conceptual framework and wide dissemination of results from project Sequencing: This project would benefit from running while other grants are active, to enable coordination as work progresses
Key other notes	We plan one joint meeting in the first year of TB MAC Thereafter at each TB MAC meeting we can feed back any important progress (and if awarded the costing grant)	TBMAC also has one joint activity provisionally planned with the other modelling consortia and possibly iDSi to examine the application of the reference case to transmission model based evaluations TB MAC also has a small amount of funding to look at how to incorporate system costs in TB models, building on the TB Targets	Key discussions still to be had is whether to do this grant like a project, or run it more as a funding facility - and or whether it should be co-financed	TB MAC identified need and proposed work package to fill gap (see CN), but direct oversight of project now removed from TB MAC mandate